Aquatic Furbearers Biology & Management

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South Carolina's Furbearer Resource

South Carolina's furbearers are a diverse group of 14 species that have been or are currently valued for their pelts, which in the past have been used for making clothing or felt. Most people prize the opportunity to observe a mink, fox, beaver, or any other furbearer in the wild, and trappers, hunters, and photographers spend many hours pursuing these elusive creatures. Furbearers also provide a direct and indirect source of income to some rural landowners who sell the hides or the rights for individuals to trap or observe these animals. Many furbearers are some of nature's best pest control agents because they eat large numbers of mice, rats, and other small mammals.

Because South Carolina's furbearers represent seven different mammal families and occupy a variety of habitats ranging from wetlands to mature forest, it is difficult to adequately present all the habitat requirements and life-history strategies for each species in this publication. Furbearer management is further complicated by:

- the varying amounts of land that different species need,
- their relationship with other furbearers and wildlife, and
- man's relationship to them.

Some furbearers like beaver, river otter, and muskrat are considered aquatic furbearers because they require surface water in sufficient size to meet their food, cover, and space needs. Other furbearers, like raccoon and mink, are classified as semi-aquatic furbearers because they are usually "water-associated." However, they can and do spend much of their lives on upland or terrestrial areas with little surface water. Terrestrial or upland furbearers like the red or gray fox, coyote, opossum, striped or spotted skunk, bobcat, and long-tailed weasel require some drinking water but are not associated with water as a general habitat requirement.

The following sections on life-history descriptions of each species are intended to provide you with a better understanding of their habits and requirements. They explain some of the similarities and complexities of managing this diverse resource.

Aquatic Furbearers: Beavers, River Otters and Muskrats

Beaver

The beaver *(Castor canadensis)* is one of the most important North American mammals from historical, economic, and aesthetic perspectives. Just like wild turkeys, white-tailed deer, and wood ducks, the restoration of beaver in this country can be considered one of America's great modern wildlife management success stories.

The pursuit of beavers, primarily for their fur which was used to make hats in Europe, led to the exploration and colonization of the majority of North America. The period from 1550 to 1840 has been called the era of beaver trade in North America. The fur trade, based largely on the sale of beaver pelts, greatly influenced the economic and political development of this country. Before the arrival of European settlers in North America, beavers could be found in almost every stream, creek, or river throughout the United States and Canada.

Early explorers and fur trappers exploited this resource and sent large numbers of beaver pelts to Europe to make hats and coats. As the supply of beavers in an area dwindled, the trappers moved into unexplored country to meet Europe's growing demand for finished goods made from beaver pelts.

This pattern of pioneer exploration and beaver extermination followed until most of North America had been explored. During the 1700s and 1800s the beaver was this continent's most important natural resource. However, by the early 1900s the beaver was almost extinct throughout much of its range because of uncontrolled harvests.

It was not until state conservation and wildlife agencies were established in the 1920s that the historic comeback of the beaver began. During this period, beavers received complete protection from trapping and hunting in many areas. This protection and subsequent natural population growth provided the important beginning of beaver restoration. From the 1920s through the 1950s, beavers were live-trapped and released into suitable habitat. This restocking program and protection were important factors in returning the beaver to its historic range and population levels. Other contributing factors were a reduced predator population (wolves, mountain lions, and bears that would eat beavers) and an increase in food sources that recovered during the beaver's absence. Many authorities believe the beaver is more abundant today than at any other time in history.

As throughout the rest of the country, the beaver was almost eliminated in South Carolina. It was most commonly found in all areas, with the exception of a narrow strip of sandy soil along the coast. These animals were trapped extensively by early trappers, and by the late 1800's or early 1900's had disappeared from most of the state. Many feel that beavers were eradicated; however, some remnant populations may have persisted in remote areas.

During the winter of 1940 to 1941, the U.S. Fish and Wildlife Service personnel released six beavers, which were captured in Georgia, on the Sandhills Wildlife Refuge in Chesterfield County, South Carolina. During this same period, beavers from Georgia began to invade the Savannah River drainage system. These animals established populations in counties which border the Savannah River.

Beavers in these two areas have increased their range significantly and presently occur in 38 of 46 counties in the state. Recent information indicates that beaver will continue to expand its range to include most, if not all, of the area where it historically occurred.

Beavers are generally considered beneficial in situations where they do not compete with people for the use of land, water, or timber. Harvesting beaver pelts in the past was a source of income. Beaver ponds also attract a wide variety of other wetland wildlife, including mink, muskrats, and raccoons.

The unique dam- and pond-building attributes of beavers create favorable habitat for a variety of wildlife species, including fish, ducks, shorebirds, amphibians, and reptiles. The variety of wildlife attracted to these ponds can be used for recreational, scientific, or aesthetic purposes. The Clemson Beaver Pond Leveler (DVD or tape available from Clemson University Department of Forestry & Natural Resources) can help manage beaver pond water levels to enhance moist-soil management, which encourages native wetland plants valuable to waterfowl.

Other benefits of beavers include ponds created by their dams that help stabilize water tables, reduce rapid runoff from heavy rainfall, and reduce soil erosion by depositing silt in the pools. Beaver castoreum, the liquid produced by the castor glands that is used for scent marking, is used in numerous trapper's lures, perfumes, and cosmetics. Finally, beaver meat is excellent table fare if properly prepared.

Beaver Characteristics

Beavers are the largest rodents in North America. They belong to the family *Castoridae*. Adult beavers weigh between 30 and 64 pounds and measure 25 to 31 inches in length. They are large-boned and heavily muscled animals with long hindlegs adapted for swimming. Their hindlegs are webbed; whereas, their forefeet are heavily clawed. They use their nimble forefeet to turn and hold small twigs while they peel the bark with their teeth.

The beaver is most recognized by its large, flat, hairless tail, which it uses as a rudder when swimming and as support when standing on land.

Beaver fur is comprised of soft, downy underfur and long, coarse guard hairs. The fur is brown, but individual coloration may range from a creamy blond to nearly black. Beavers comb and groom their fur with the aid of a second toenail on their hind feet. The sexes are indistinguishable, except for nursing females with swollen mammary glands.

Like many other rodents, beavers have large, orange front teeth (incisors) that grow continuously throughout their life. Located directly behind these incisors is a set of lips that seal when the beaver dives under water. The animal also has valves inside the ear and nose that close when it is under water. These closed valves and lips allow the beaver to cut and gnaw on woody or herbaceous plant material under the water.

Habitat Needs

The beaver is one of a few mammals, other than man, capable of modifying the habitat to suit its needs. When beavers move into an area, they quickly begin building dams to modify the habitat more to their liking. Once the dam has been built from surrounding trees, the subsequent flooding causes the trees to die and other aquatic plants to begin growing. Often the new plant growth around the edge of a pond (willows, blackgum, and sweetgum) are preferred beaver foods.

Beavers are found in a wide variety of wetland habitats ranging from small streams to large lakes or reservoirs that have stable water levels. Any water source that has ample flow for damming activities and a suitable food supply is a potential beaver site. Good beaver habitat can be almost any place with a year-round source of water. Appropriate habitat can include streams, rivers, ponds, lakes, swamps, wetlands, and drainage ditches. Beavers living in habitat with good winter food resources appear to have larger litters. The winter food resource also influences the age when the young move from the den or lodge and therefore affects the age when young beavers breed.

Beavers feed on the cambium layer (just under the bark) of woody plants and a variety of aquatic and upland vegetation. Preferred woody foods include willows, birch, maple, alder, cherry, and poplar, although they can and will feed on the leaves, twigs, and bark of more than 40 woody species. During the summer, they also eat water lilies, pond

weeds, and cattails. Sometimes beavers travel substantial distances from the pond or stream to get to corn or soybean fields, where they cut the entire plant off at ground level and drag it back to the water. What they do not eat, they use for constructing dams and lodges.

Beavers are highly territorial and stationary animals. They actively defend their colony's territory against outsiders by using scent marking. Annual home ranges usually vary from ½ to 1½ miles of stream length. However, home range size varies greatly by the water system where the beaver lives.

"Busy as a beaver" appropriately describes beaver behavior. Beavers are active for about 12 hours each night, feeding and working on the dam. Most daily movements are centered around the pond and lodge. The female parent in the colony is relatively stationary during the spring and summer as she cares for the young. When young beavers move to another location to establish their own territory, they may travel 5 to 6 miles. Other travels by individual beavers include wanderings by yearlings and adults who have lost their mates.

Reproduction

Beavers are social animals and live in family units called colonies that range in size from 2 to 8, with an average size of 5 to 6. A colony consists of the adult pair, the current year's offspring (kits), the previous year's offspring, and occasionally a 2½-year-old offspring. When beavers become sexually mature, usually at about 18 months, they leave their home colony to form a colony of their own.

Beavers are monogamous, and mate in January and February. Two to 4 1-pound kits (similar in appearance to the adults) are born in March and April. The kits grow rapidly, nursing for about 60 days. By 6 months of age they weigh between 8 and 10 pounds. The female does all of the kit-rearing.

Beavers have a relatively long life-span for a wild animal. Most beavers do not live beyond 10 years of age although some may live 20 years or more. Not many animals eat beavers. Historically, wolves and coyotes preyed on the animal. Predation by river otters has been documented, but it is rare. Today, man is their primary predator, and predation is not considered a limiting factor in most cases.

Beavers also die from starvation during the winter in the northern portion of their range. Sudden rises in water level during iced-over periods can result in mass drownings. Tularemia is a disease that can cause widespread population declines.

Trapping is about the only effective method to control beavers. For control of beaver problems, visit the website Internet Center for Wildlife Damage Management (www.icwdm.org).

River Otter

No other North American furbearer inspires such a wide variety of images as does the North American river otter *(Lutra canadenis)*. The river otter is one of the most playful members of the weasel family *(Mustelidae)*. The media has used this playfulness to make the river otter one of America's most popular wildlife species. However, a variety of television programs depicted domestic otters, giving rise to several misconceptions about the life of otters in the wild. The following description provides a realistic view of the life of a wild otter.

River Otter Characteristics

The North American river otter is a long, cylindrical, semi-aquatic mammal. It has small ears and eyes and a flattened head with a prominent nosepad. The animal's size surprises most people. Otters weigh between 11 and 30 pounds and measure 36 to 50 inches long. The long, heavy tail, tapering from the body to its tip, comprises about ⅓ of the animal's length. Otters have short feet with fully-webbed toes. Male otters are generally larger than females.

River otters have a thick, durable, and luxurious pelt which was once the standard to which all other North American furs were compared. Pelt coloration on the back and sides ranges from light to dark chocolate brown. The belly is usually lighter in color with the neck region appearing to have a silvery sheen when observed in bright sunlight.

Historically, otters could be found in every major river system throughout the United States and Canada. The river otter was only absent from the arid Southwest and extreme northern Canada and Alaska. Currently, otters are found in 45 states and all of the Canadian provinces. This sounds as if they are still widespread; however, some midwestern states have only small, isolated populations that are present due only to restoration efforts. During the early to mid-1980s the following states began river otter reintroduction or restoration programs: Arizona, Colorado, Iowa, Kansas, Minnesota, Missouri, Nebraska, Oklahoma, Pennsylvania, Tennessee, and West Virginia. The greatest river otter densities probably occur in Louisiana's swamps and marshes, while lowest densities occur in Rocky Mountain streams.

In South Carolina, the river otter appears to be doing quite well despite a nationwide decline. Otter populations are well established in every county in South Carolina and support a controlled harvest.

Historical records are incomplete, but available information suggests river otters were abundant before the arrival of European settlers on this continent. At the peak of land settlement in this country around the late 1800s and early 1900s, river otters were at their lowest population levels. The otter was totally eliminated from a large portion of its historical range as a result of:

1) unregulated hunting and trapping,
2) changing land-use patterns,
3) water pollution, and
4) more recently, acid rain.

Man, through environmental degradation and over-exploitation for pelts, has been the primary threat to otters.

Habitat Needs

Otters prefer a wide variety of aquatic and wetland habitats. In general, otter habitat consists of any area that has a stable water level, an ample food supply (primarily fish), and no water pollution. Home to an otter is a beaver lodge, overhanging bank and previously excavated burrow, or root wads. Many river otter den sites are of beaver origin, either bank dens or lodges. Otters frequent these sites even when beavers are present in the lodges. Otters have also been observed using man-made Canada goose nesting platforms as daytime resting sites.

Chemical, industrial, and agricultural pollution has altered many of our pristine streams. In South Carolina, the major factor limiting otter abundance is water quality. Another detrimental factor affecting river otters has been the unabated destruction of wetland habitats. Habitat destruction (wetland drainage), decreased water quality, and the increase of pesticides in the water have all resulted in population declines. Historically, trapping otters for fur resulted in decreased populations; however, with carefully managed harvests, stable populations can be maintained.

The feeding habits of river otters have been extensively studied. Otters are primarily fish eaters, although crayfish are also a favored food. Snakes, frogs, salamanders, snails, insects, clams, earthworms, and a variety of mammals and birds have been recorded in otter diets. Otters' feeding preference is usually based on what is available at the specific location. In the southern portion of their range where fish productivity is high, otters eat fish but eat crayfish when they are available. The relative abundance of various fish species and their maneuverability determine which fish species are eaten. This means that otters prey more on slow moving fish than on faster moving species.

River otters are solitary animals, although a family group of a female and her young are occasionally seen. Sometimes when food is abundant, otters gather in large concentrations. For the most part, otters are active at night but occasionally may be active during the day. The seasonal movements of otters vary between sexes and individuals.

The most important factor in determining home range size is the presence of an activity center. Activity centers have adequate water, cover, and food. Otter home range size is determined by the distance between activity centers. Daily travels may range from 1 to 1½ miles of stream. Over the course of a year, otters may range up to 10 miles, and during their lifetime they may travel up to 100 miles. Males generally have larger home ranges due to increased activity during the breeding season.

River otters do not seem to be territorial in the usual sense. Several otters can use the same home range area and activity center, but they avoid each other within that area by scent marking. When otters defecate, they deposit a musky-smelling secretion from a gland located at the base of their tail. They also make a mark at the junction of stream tributaries, crossings at beaver dams, and other areas where otters might travel.

Reproduction

Otters become sexually mature at 2 years of age. Breeding season begins in late winter and early spring. Otters are monogamous and, like other members of the weasel family, exhibit delayed implantation. After insemination, the fertilized egg will develop slightly. It then enters a period of suspended animation when no further development occurs until it implants in the uterine wall 7 to 10 months after fertilization. The egg then continues to develop, and the active stage of pregnancy lasts only about 60 days.

One to 5 blind and helpless young (the average litter size is 2) are born January through May. The young open their eyes between 21 to 35 days after birth, and at 2 months of age they are introduced to the water. Young otters begin eating solid food by 2 weeks of age and are totally weaned at 3 months. The mother is their sole caretaker. The family group of mother and young will begin to break up about 3 months after weaning. The cycle begins again when mating occurs immediately after the birth of the young.

The major cause of otter mortality is trapping in states which allow harvesting. Unregulated harvesting and habitat destruction played a major role in drastically reducing river otters from South Carolina in the early 1900s.

Muskrat

Muskrats *(Ondatra zibethicus)* are the most valuable furbearing animal in this country, not in price per pelt, but in numbers harvested. They also hold a special place in the wildlife community because much of the scientific theory relating to compensatory mortality was derived from experiments with muskrats. Paul Errington, who conducted extensive experimentation on muskrats in the 1930s through 1960s, authored four books based on his studies of muskrats, marshes, and predation. Errington found that when large numbers of muskrats are removed from a population (by trapping, predators, disease, etc.), the muskrat responds to the reduction by increasing its litter size and the number of litters a year by lengthening the breeding season.

Muskrats get their name from the pair of musk glands located at the base of their tails. These glands are used during the breeding season

when musk is secreted to mark logs or other areas around houses, bank dens, or trails on the bank.

Muskrat Characteristics

Muskrats are the largest *microtine* (meadow mice-vole family of rodents) rodent in the United States. Muskrats are stocky animals with a broad head and short legs. They have a flattened tail, which is scaly and sparsely haired. Their pelts consist of soft, thick underfur with long, glossy dark-red to dusky-brown guard hairs. Their unwebbed front feet have 4 sharp-clawed toes and a small thumb. Their large hind feet are webbed or partially webbed with stiff hairs along the toes. Muskrats measure 16 to 25 inches in length, with the tail measuring 7 to 11½ inches. Adult muskrats weigh between 1¾ and 4¼ pounds.

Muskrats can be found from near the Arctic Circle in Canada to the Gulf of Mexico. They are found in every state except Florida. They can be found throughout South Carolina, but are absent from coastal areas. High salinity may be a factor for their lack of presence in these areas. South Carolina populations are found primarily in the Piedmont and in the northeastern section of the Upper Coastal Plain. In the Piedmont muskrats are found in most aquatic areas and reach their highest numbers in beaver ponds. Below the fall line muskrats are restricted to just a few counties on the northeast end of the Coastal Plain.

Habitat Needs

Muskrats live in a large variety of habitats. The habitat for muskrats is almost anywhere they can find a year-round supply of food and water. They are found in ditches, streams, marshes, lakes, beaver ponds, mine pits, farm ponds, or any wetland area. For shelter they use bank burrows, houses built of vegetation, and feeding huts. Bank burrows are usually 6 inches by 8 inches and are up to 60 inches long. Muskrats use bank dens mostly during the summer.

Muskrat houses are cone-shaped and measure up to 2¾ yards in diameter. They are usually constructed of cattail or bulrush stems. Their height varies, and each house will have one or two separate raised internal chambers. Muskrats usually begin house construction in October, which peaks in November. Feeding huts are platforms of marsh vegetation where the muskrat brings food to eat. These circular huts are usually smaller than houses.

The key component of muskrat habitat is slow-moving or non-flowing water that allows the growth of aquatic vegetation. Ideally, the water should be two to three feet deep. Cattails, bulrush, sedges, and arrowhead (excellent for food and house construction) should be present around the bank.

Muskrats are vegetarians and relish cattails, bulrush, smartweed, duck potato, horsetail, water lily, sedges, young willow sprouts, and pickerel weed. Muskrats will eat almost any aquatic vegetation, including the bulbs, roots, tubers, stems, and leaves of numerous wetland plants. They occasionally eat corn, soybeans, grain sorghum, and small grains. At times, particularly during periods of low food supply, muskrats will eat animals, including crayfish, mussels, turtles, frogs, or fish.

Muskrats are not great travelers, and the average home range varies from a 66- to 200-foot circle in optimal habitat. During the spring or fall, and at times of crisis (flooding, drought, food shortages), muskrats can move considerable distances. Muskrats disperse in the spring, beginning in February and March and lasting about 1½ months, when males begin moving. The distance moved varies, and it appears that all ages of muskrats, not just the young, disperse every spring.

Reproduction

Muskrats are prolific breeders. They can produce an entire generation in about 30 days. Litter size and the number of litters per year are related to latitude. Muskrats produce fewer and smaller litters the farther north they live. In this area, muskrats have 3 to 4 young per litter and may have 3 or more litters per year. Muskrats may breed year round, but the breeding season usually runs from March through October, with a peak in March through June. Muskrats are generally monogamous. The decline in the number of litters throughout the breeding season is due to the decline in sexual activity of the males. Mating usually occurs while the muskrats are under water.

Twenty-eight to 29 days after mating, 3 to 11 blind, naked, and helpless muskrats are born. The young weigh about ¾ of an ounce and are 4 inches long. After one week, they are covered with a coarse gray-brown fur. Their eyes open at 14 to 16 days, and at this time they begin to swim, climb, and dive. The female cares for the young (kits). The kits are weaned by about the 24th day and fend for themselves by the end of their first month. The mother should be ready to give birth again by this time. The first litter may stay in the nest; then the mother will add another nest chamber to accommodate the new litter. Males become sexually mature by 6 to 7 months of age, and females born in early spring may be bred in the fall of the same year. The litter size of females bred in their first year will usually be small.

Muskrat populations appear to follow a cycle. This cycle reflects how muskrats influence their food supply. In general, the cycle follows this pattern:

1) muskrat numbers are low,
2) a large food supply develops,
3) overpopulation occurs due to good breeding condition of muskrats,
4) habitat is damaged with "eatouts" occurring,

5) starvation occurs as a large number of muskrats compete for a limited food supply, and

6) muskrat numbers are low.

These cycles vary from 5 to 6 years in some areas to 10 years in other areas.

Muskrat densities vary depending on the phase of the population cycle, habitat type and its condition, social pressure by other muskrats, competition, harvest, predation, and geographical area. It appears the amount of shoreline is more important than pond size in determining muskrat population levels. Maximum breeding densities appear to be five pairs per 2½ acres or one pair per 28½ miles of shoreline.

Muskrats are eaten by a host of predators, including hawks, owls, raccoons, mink, fox, coyote, and even largemouth bass and snapping turtles. Muskrats also prey upon other muskrats. During periods of overcrowding, other muskrats may kill entire muskrat litters. During a drought year, when overcrowding problems are magnified, muskrats are particularly susceptible to being eaten by other muskrats and a variety of species already mentioned. Trapping accounts for a high percentage of muskrats being removed from the population each year. Diseases such as tularemia and hemorrhagic disease can devastate an entire population.